

Amendments to the Specification

Please delete the heading "Description" on page 1, line 2.

Please add the following heading after the title of the invention on page 1, line 2:

Background of the Invention

Please replace the paragraph beginning on page 1, line 10 through line 11, which starts with "In recent years, and axial" with the following rewritten paragraph:

In recent years, an axial gap type electric motor is used on a rear axle of an electric two-wheeler, as a power source. Such a motor ~~is comprised of~~ includes a stator fixed to a rear arm extending from a body frame, and a rotor rotating with respect to the stator for transmitting power to a rear wheel.

Please delete the heading "Disclosure of Invention" on page 1, line 23.

Please replace the paragraph beginning on page 1, line 23 through line 29, which starts with "As described above, a yoke" with the following rewritten paragraph:

As described above, a yoke of a rotor in an axial motor for an electric two-wheeler is configured such that a magnetic pole-carrying face and a shaft portion supported for rotation by a bearing are joined together, therefore production control is required for the processes such as welding or the like, or for each ~~parts~~ part, which lowers productivity and as a result, production costs are increased.

Please replace the paragraph beginning on page 1, line 17 through line 19, which starts with "In view of the foregoing" with the following rewritten paragraph:

In view of the foregoing, an ~~object~~ advantage of this invention is to provide a rotary electric machine of high productivity/maintainability.

Please add the following heading on page 2 line 20:

Summary of the Invention

Please replace the paragraphs beginning on page 2, line 21 through page 3, line 12, which start with "In order to solve the foregoing" with the following rewritten paragraphs:

In order to solve the foregoing problems in the prior art, ~~this invention of claim 1~~ an embodiment of the present invention is directed to a rotary electric machine having a fixed stator, and a rotor rotated by electromagnetic energy from the stator; ~~characterized in that the~~ The rotor has in its radially outer region a magnetic pole-carrying face, a stepwise drawn portion concentric with the face, and a cylindrical shaft portion, on the rotational axis of the rotor, formed in its radially inner region, the shaft portion or the drawn portion being formed with a face perpendicular to the rotational axis.

~~This invention of claim 2 is directed to the rotary electric machine as set forth in claim 1, in which a~~ A space for a one-way clutch to be housed is formed by the stepwise drawn portion.

~~This invention of claim 3 is directed to the rotary electric machine as set forth in claim 1 or 2, in which~~ According to an embodiment of the present invention, the magnetic pole-carrying face, the stepwise drawn portion and the shaft portion are formed integral with each other.

~~This invention of claim 4 is directed to the rotary electric machine as set forth in any of claims 1-3, in which a~~ A female thread is formed in the face within the rotor perpendicular to the rotational axis around which the rotor rotates. ~~This invention of claim 5 is directed to the rotary electric machine as set forth in claim 4, in which and also~~ the female thread is formed on the rotational axis. ~~This invention of claim 6 is directed to the rotary electric machine as set forth in claim 4, in which~~ Further, the female thread is formed in a plurality around the rotational axis at regular intervals.

Please replace the paragraphs beginning on page 3, line 14 through line 27, which start with "Fig. 1 is a side view" with the following rewritten paragraphs:

Fig. 1 is a side view of an electric two-wheeler applied to an electric motor according to this invention;

Fig. 2(a) is a plan view of a stator, and Fig. 2(b) is a sectional view taken on line A-A of Fig. 2(a);

Fig. 3(a) is a plan view of a rotor, and Fig. 3(b) is a sectional view taken on line A-A of Fig. 3(a);

Figs. 4(a) and 4(b) are views showing the rotor 40 with the one-way clutch being housed;

Fig. 5 is a view showing a method of removing the rotor 40;

Fig. 6 is a view showing a method of removing the rotor 40A; and

Fig. 7(a) is a view showing the shape of the rotor 40A in detail, and Fig. 7(b) is an enlarged view of the portion A of Fig. 7(a).

Please replace the heading on page 3, line 28, with the following rewritten heading:

~~Best Mode of for Carrying Out~~ Detailed Description of the Invention

Please replace the paragraph beginning on page 3, line 33 through page 4, line 5, which starts with "An electric two-wheeler 1" with the following rewritten paragraph:

An electric two-wheeler 1 shown in Fig. 1 has a body ~~comprising~~ including a head pipe 2 at an upper front part. A steering shaft (not shown) is rotatably inserted through the head pipe 2, and has an upper end to which handlebars 3 are attached. Grips 4 are fitted over the opposite ends of the handlebars 3. The grip 4 on the right side (on the far side in Fig. 1, not shown) constitutes a throttle grip which is rotatable.

Please replace the paragraph beginning on page 4, line 32 through page 5, line 4, which starts with "A pair of right and left" with the following rewritten paragraph:

A pair of right and left rear arm brackets 19 (only one of them is shown in the drawing) are attached by welding to the rear ends of the right and left body frames 11, respectively. A rear arm 20 is supported at the front end by the rear arm brackets 19 via a pivot shaft 21 for a vertical swinging movement. A rear wheel 22 as a driving wheel is rotatably mounted on the rear end of the rear arm 20. The rear arm 20 and the rear wheel 22 are suspended from the body frames 12 by a rear cushion 23.

Please replace the paragraphs beginning on page 5, line 23 through page 6, line 21, which start with "A rotor 40, which is rotated" with the following rewritten paragraphs:

A rotor 40, which is rotated by electromagnetic energy from the stator 31, ~~comprises~~ includes a yoke 41 and magnetic poles 42 bonded thereto. The yoke 41 is formed from a metal plate punched out in a disk-like shape and drawn stepwise concentrically, and formed with a cylindrical shaft portion 43 in its centermost part. The shaft portion 43 is a portion by which the

yoke 41 is held for rotation. To the yoke 41 at the outside circumferential portion are bonded alternately S- and N-magnetic poles 42 of rectangular shape. That is, the yoke 41 is formed, integrally, with a magnetic pole-carrying face, a stepwise drawn portion and the shaft portion 43, so that it can be manufactured at a low costs. Also, a space 44 for a one-way clutch to be housed is formed by the stepwise drawn portion.

Figs. 4 (a) and 4(b) are views showing the rotor 40 with the one-way clutch being housed. Fig. 4(a) is a sectional view taken of line A-A of Fig. 4(b), and Fig. 4(b) is a sectional view taken on line B-B of Fig. 4(a). The one-way clutch 50 allows power transmission from the electric motor 28 to the rear wheel 22 and shuts off power transmission in the opposite direction, for the prevention of overcharging of a battery or for the mitigation of push and walk load. The one-way clutch 50 is press-fitted in a space 44 of the yoke 41 having a bearing 45 press-fitted in the shaft portion 43. The one-way clutch 50 is arranged such that a plurality of columnar rollers 53 are held between an outer race 51 and an inner race 52 each of a cylindrical shape. These rollers are held separate from each other by a roller holder 54. The roller holder 54 has a shape in which portions in the upper part of a cylinder corresponding to the rollers 53 are cut out. The outer race 51 is press-fitted in the yoke 41 for fixing. The inner race 52 rotates the rear wheel 22 through a planetary gear speed changer (not shown). In the inside circumferential surface of the outer race 51 at positions corresponding to the rollers are formed grooves 55 each having different depths at the left and right sides.

Please replace the paragraphs beginning on page 6, line 28 through page 7, line 22, which start with "If the electric motor 28" with the following rewritten paragraphs:

If the electric motor 28 is driven and the yoke 41 rotates in the direction of the arrow Y, the outer race 51 is rotated in the same direction and biases the roller holder 54 in the direction of Y, and the rollers are biased further toward the shallower sides of the grooves 55. Therefore, the rollers 53 are held between the outer race 51 and the inner race 52 and transmit a drive force from the outer race 51 to the inner race 52. Thus, the rear wheel is driven.

On the contrary, when a throttle is closed during running or at the time of push and walk, the rear wheel 22 is rotated and the inner race 52 rotates in association with the rotation of the wheel 22, while no drive force from the rotor 40 is transmitted to the outer race 51. In this case, the inner race 52 biases the rollers 52 toward the deeper sides of the grooves 55 against the force

of the pin 57, so that no force is transmitted from the inner race 52 through the outer race 51 to the electric motor 28. Therefore, a disadvantage can be prevented such that the electric motor 28 may generate electricity in such a case.

In addition, since a stepwise drawing process is applied to the yoke 41, a space can be provided, not around the shaft formed integral with the yoke 41 of the rotor 40, but inside the shaft. Therefore, a one-way clutch 50 can be disposed using the space, providing a compact structure. That is, a space for the one-way clutch to be housed is formed by the stepwise drawn portion, so that the one-way clutch 50 can be disposed near the rotational axis and thus the moment of inertia becomes lower, enabling the rear wheel to rotate at a low torque. Further, the rear wheel 22 becomes more compacter, so that a slimmer rear wheel can be materialized with a higher design quality. The width of the rear wheel 22 can be decreased, enabling a larger banking.

Please replace the paragraph beginning on page 9, line 11 through line 14, which starts with “Even a rotor comprising in” with the following rewritten paragraph:

Even a rotor ~~comprising~~ including in combination a face carrying the magnetic poles 42 and a shaft portion 43 will produce the same effect and function if it is formed with a face perpendicular to the rotational axis.

Please replace the paragraphs beginning on page 9, line 21 through page 10, line 7, which start with “As described above, the rotary” with the following rewritten paragraphs:

As described above, the rotary electric machine of this embodiment has a fixed stator, and a rotor rotated by electromagnetic energy from the stator, characterized in that the rotor has in its radially outer region a magnetic pole-carrying face, a stepwise drawn portion concentrical with the face, and a cylindrical shaft portion, on the rotational axis of the rotor, formed in its radially inner region; ~~the~~ The shaft portion or the stepwise drawn portion ~~being~~ is formed with a face perpendicular to the rotational axis. Therefore, an accurate gap control can be achieved by applying a certain pressure to the magnetic poles with a jig or the like using the flat face as a reference, or by controlling the distance from the flat face. As a result, a rotary electric machine with high productivity / maintainability can be provided.

Further, since a space for a one-way clutch to be housed can be formed by the stepwise drawn portion, if the one-way clutch is housed in this space, a more compact and thinner design can be materialized.

Further, since the magnetic pole-carrying face, the stepwise drawn portion and the shaft portion are formed integral with each other, handling becomes easier, providing a high productivity.